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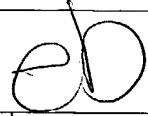
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,876	12/29/2000	Hideo Itoh	201419US0X	6748
22850	7590	02/17/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			CHEVALIER, ALICIA ANN	
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ALEXANDRIA, VA 22314			PAPER NUMBER	

1772

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/749,876	Applicant(s) ITOH ET AL. 
	Examiner Alicia Chevalier	Art Unit 1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 50-95 is/are pending in the application.
 4a) Of the above claim(s) 57,59,60,63,64,72,75 and 78-94 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 55,58,70 and 73 is/are allowed.
- 6) ☒ Claim(s) 50-54, 56, 61, 62, 65-69, 71, 76, 77 and 95 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

RESPONSE TO AMENDMENT

Request for Continued Examination

1. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on November 17, 2003 is acceptable and a RCE has been established. An action on the RCE follows.
2. Claims 50-95 are pending in the application, claims 57, 59, 60, 63, 64, 72, 75 and 78-94 are withdrawn from consideration due to Applicant's election. Claims 1-49 have been cancelled.
3. Amendments to claims in paper #12, filed on October 9, 2003, have been entered in the above-identified application.

WITHDRAWN REJECTIONS

4. The 35 U.S.C. §112 rejections of claims 50-56, 58, 61, 62, 65-71, 73, 76, 77 and 95, made of record in paper #10, mailed June 18, 2003, pages 2-3, paragraph#3 have been withdrawn due to Applicant's amendment in paper #12.
5. The 35 U.S.C. §103 rejection of claims 50, 51, 53, 54, 56, 61, 62 and 95 as over Tabata et al. (US Patent No. 5,407,738), made of record in paper #10, pages 3-4, paragraph#4 has been withdrawn due to Applicant's amendment in paper #12.
6. The 35 U.S.C. §103 rejection of claims 52, 65-96, 71, 76 and 77 as over Tabata et al. (US Patent No. 5,407,738) in view of Kumazawa et al. (US Patent No. 6,248,436), made of record in paper #12, page 5, paragraph #5 has been withdrawn due to Applicant's amendment in paper #12.

NEW REJECTIONS

7. **The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.**

Examiner's Summary of the Invention

8. To the best of the Examiner's knowledge, the elected base, or independent claims of the applicant, are interpreted as follows:

50. A photocatalytic member comprising

- a substrate
- a laminate on the substrate
 - o plurality of thin-film plurality of thin-film photocatalytic layers made of photocatalytic material
 - o plurality of thin-film support layers
 - o the photocatalytic layers alternating with support layers
 - o the support film has a smaller surface area than the surface of the contacting photocatalytic layers
 - o there is space between adjacent photocatalytic layers and next to a support layer, space being open to the outside of said member
 - o the photocatalytic layer nearest the substrate is the lowermost photocatalytic layer, the remaining layers being sequentially more distant from the substrate.

55. A photocatalytic member comprising

- a substrate

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- a laminate on the substrate
 - o plurality of thin-film plurality of thin-film photocatalytic layers made of photocatalytic material
 - o plurality of thin-film support layers
 - o the photocatalytic layers alternating with support layers
 - o the support film has a smaller surface area than the surface of the contacting photocatalytic layers
 - o there is space between adjacent photocatalytic layers and next to a support layer, space being open to the outside of said member
 - o the photocatalytic layer nearest the substrate is the lowermost photocatalytic layer, the remaining layers being sequentially more distant from the substrate.
- an opening on a surface of the member and through the photocatalytic layer
 - o the space communicates with the opening in order to be open to the outside of the member
 - o wherein the opening is circular, elliptical, or polygonal.

58. A photocatalytic member comprising

- a substrate
- a laminate on the substrate
 - o plurality of thin-film plurality of thin-film photocatalytic layers made of photocatalytic material
 - o plurality of thin-film support layers
 - o the photocatalytic layers alternating with support layers

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- the support film has a smaller surface area than the surface of the contacting photocatalytic layers
- there is space between adjacent photocatalytic layers and next to a support layer, space being open to the outside of said member
- the photocatalytic layer nearest the substrate is the lowermost photocatalytic layer, the remaining layers being sequentially more distant from the substrate.
- an opening on a surface of the member and through the photocatalytic layer
 - the space communicates with the opening in order to be open to the outside of the member
- wherein the support layers are disposed at a center of the spaces to support the catalytic layers and maintain the spaces and each support layer has a circular, elliptical, or polygonal cross section when viewed from the surface of the member
- the laminate is deposited on a portion or an entire surface of the substrate.

Examiner's Comment

9. Claim 58 recites "a plurality of thin-film ***photocatalytic*** layers" in lines 4-5 and then recites "thin-film ***catalytic*** layers" in line 18. While "catalytic" is not indefinite and it is not unclear which layer Applicant is referring to, it is preferred to consistently use the same term to refer to the same layers.

Claim Rejections - 35 USC § 103

10. Claims 50-54, 56, 61, 62, 65-69, 71, 76, 77 and 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al. (U.S. Patent No. 5,407,738) in view of Kumazawa et al. (U.S. Patent No. 6,248,436).

Tabata discloses a minute structure for showing colors by reflection and interference of natural light, which is used as fibers and chips for textiles and coatings (*col. 1, lines 9-12*).

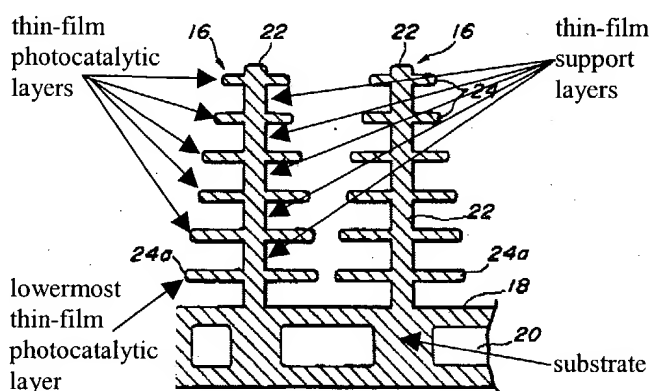
Tabata discloses a minute structure, Applicant's "photocatalytic member," for showing colors by reflection and interference of natural light. The minute structure comprises base portion, Applicant's "substrate", a plurality of fin portions, Applicant's "thin-film photocatalytic layers," and central portions, Applicant's "thin-film support layers" (*col. 3, lines 35-42 and figures 3 and 4*). Figures 3 and 4 show that the fin portions and central portions alternate with each other and contact sequentially at surface areas and that the central portions have a smaller surface area than the surface area of the contacting fin portions. Figures 3 and 4 also show a space between adjacent fin portions and next to central portions, the space being open to the outside of the structure. The figures further show that the fin portion nearest the base portion is the lowermost fin portion and the remaining layers being sequentially more distant from the base portion. The structure can be made from transparent material such as polyester, polyacrylonitrile, polystyrene or the like (*col. 4, lines 31-37*).

Although, Tabata does not specifically disclose that the central portion and the fin portions are separate layers it can be seen from figure 4(a) of the instant application and figure 4 in Tabata that these are equivalent structures.

For convenience, the table below shows Applicant's structural limitations with the corresponding prior art structural feature.

<i>Applicant</i>	<i>Tabata</i>
substrate	base portion
thin-film photocatalytic layers	fin portions
thin-film support layers	central portions

The following figure from Tabata accompanies the discussion of claim 50.



Tabata fails to disclose that the thin-film photocatalytic layers are made of a photocatalytic material.

Kumazawa discloses a color exhibition structure (*title*) for use in fabrics or paints to exhibit a color produced by reflection, interference and/or scattering or a light incident thereon (*col. 1, lines 7-9*). The structure comprises a transparent substance with a minute granular substances dispersed therein (*col. 2, lines 41-42*). The transparent substance is material such as polyester, polyacrylonitrile, polystyrene or the like (*col. 4, lines 7-11*). The granular substance comprises anatase type titanium dioxide (*col. 4, lines 29-31*), Applicant's "photocatalytic material". Furthermore, Applicant admits on page 1 of the specification that titanium dioxide is known to exhibit a photocatalytic effect and is therefore a photocatalytic material.

The improved structure can exhibit a desired vivid color within a visible light range (*col. 1, lines 38-40*), by having a transparent substance with a first refractive index and granular substances having a second refractive index greater than the first refractive index (*col. 1, lines 46-49*). Furthermore, the structure can produce a color regardless of the direction of incidence of the light thereon and exhibit a vivid color to provide good appearance (*col. 4, lines 53-62*).

Tabata and Kumazawa are analogous because they discuss color exhibiting structures for fabrics/textiles and paints/coatings in which the color is produced by reflection and interference.

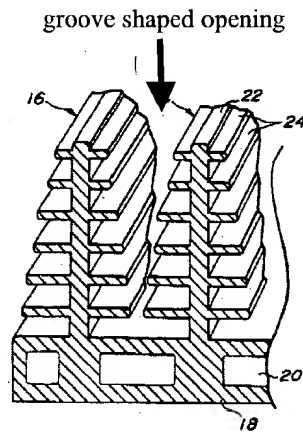
It would have been obvious to one of ordinary skill in the art at the time of the invention to disperse Kumazawa's anatase type titanium dioxide minute granular substances in Tabata's transparent material in order to enhance the vividness of the color produced.

One of ordinary skill in the art would have been motivated to add the titanium dioxide granules to the transparent material of Tabata because the granules have a higher refractive index than the transparent material which produces a color regardless of the direction of the incidence light (*Kumazawa col. 4, lines 53-62*) and improve the vividness of the color (*Kumazawa col. 1, lines 38-40*).

It is desirable to see color regardless of the direction of the incident light in order to allow the color to be seen from any viewing angle.

Regarding Applicant's claim 51, 54 and 56, Tabata's figure 3 shows that the structure has an opening on the surface and through the fin portions and that space communicates with the opening in order to be open to the outside of the structure of the opening. Also, figure 3 shows the openings are shaped like parallel grooves. Furthermore, the fin portions are spaced along the base portion at uniform intervals (*col. 3, lines 35-42 and figure 3*).

The following figure from Tabata accompanies the discussion of claim 51 and 54.



Regarding Applicant's claims 61 and 62, Tabata's figure 3 shows that the fin portions have surface areas that are larger toward the lowermost fin portion (*col. 3, lines 43-48*).

Regarding Applicant's claim 95, the exact thickness of the fin portions and spaces between them are deemed to be cause effective variables with regard to the reflectance of the structure, i.e. the color produced. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as thickness of the fin portions and the spaces between them through routine experimentation in the absence of a showing of criticality in the claimed thickness. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). One of ordinary skill in the art would have been motivated to optimize the thickness of the fin portions and the spaces there between in order optimize the reflection and interference of the incident light to produce the desired color.

Allowable Subject Matter

11. Claims 55, 58, 70 and 73 are allowed.

REASONS FOR ALLOWANCE

12. The following is an examiner's statement of reasons for allowance:

The closest prior art found is summarized above:

The prior art fails to teach or suggest the an opening on a surface of the member and through the photocatalytic layer, the space communicates with the opening in order to be open to the outside of the member and wherein the opening is circular, elliptical, or polygonal, claim 55, or an opening on a surface of the member and through the photocatalytic layer, the space communicates with the opening in order to be open to the outside of the member and wherein the support layers are disposed at a center of the spaces to support the catalytic layers and maintain the spaces and each support layer has a circular, elliptical, or polygonal cross section when viewed from the surface of the member, claim 58.

In summary, the prior art of record fails to teach or suggest the photocatalytic member having all the features of base claims 55 and 58.

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

ANSWERS TO APPLICANT'S ARGUMENTS

14. Applicant's arguments in paper #12 regarding the U.S.C. §103 rejection over Tabata only of record have been considered but are moot since the rejections have been withdrawn.

15. Applicant's arguments in paper #12 regarding the U.S.C. §103 rejection over Tabata in view of Kumazawa of record have been carefully considered but are deemed unpersuasive.

Applicant's argument that "it is not the fact that 'Tabata discloses all the limitations all the limitations of the instant invention except for the plurality of thin-film photocatalytic layers made of titanium oxide'" is moot due to the new grounds of rejection.

Applicant argues that the use of titanium oxide would be contrary to Tabata's teaching and cites Tabata col. 4, line 35+. While Tabata states that it is not *preferable* to use inorganic materials (*col. 4, lines 28-30*), it does not disclose that the use of inorganic material would render the invention inoperable. Furthermore, Tabata discloses inorganic materials as one of the possible materials for the structure (*col. 4, lines 27-28*). Therefore, since Tabata does disclose that inorganic metals can be used, but are not preferred, the use of titanium oxide granules would *not* be contrary to the teaching in Tabata.

Applicant argues that using granular material to increase scattering efficiency is not suggested by Tabata. The Examiner agrees, which is why an obviousness rejection was made in view of Kumazawa, which does suggest the use of granular material to increase scattering efficiency. Furthermore, Applicant appears to be arguing against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that more than one layer is present in the structure and this is not the type of structure envisioned by Tabata and the combination is not based upon the references disclosure. The column and line that Applicant is referring to in Kumazawa, col. 8, line 4+, is referring to the second embodiment of the color exhibition structure of the invention of Kumazawa (*col. 8, line 4-5*). The first in embodiment is merely the resin with minute granular substances dispersed therein, formed in several different shapes (*col. 2, lines 36-51 and figures 1a-1h*). Also, figure 1F in Kumazawa is almost identical to figure 3 in Tabata. Furthermore, Kumazawa is relied upon for the materials used, not the structure. The improvement in Kumazawa is from the transparent substance having a first refractive index and the granular substance having a second refractive index greater than the first refractive index (*col. 1, lines 38-49*). Therefore, it would have been obvious to disperse Kumazawa's anatase type titanium dioxide minute granular substances in Tabata's transparent material in order to enhance the vividness of the color produced, by having two materials with different refractive indexes.

Applicant's argument regarding pigment type photocatalytic materials as disclosed in Kumazawa is confusing. Kumazawa is not adding the granules as a "pigment." The granules are added to create a structure with a transparent substance having a first refractive index and a granular substance having a second refractive index greater than the first refractive index (*col. 1, lines 38-49*). The differences in refractive indexes allow the structure to reflect and scatter light and thus produce color (*col. 3, lines 1-19*). The granules help create a refractive index difference, not "pigment" the structure.

Conclusion

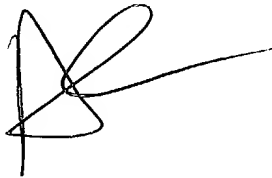
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia Chevalier whose telephone number is (571) 272-1490. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:00 pm.

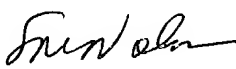
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571) 272-1498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ac

2/4/04




SANDRA M. NOLAN
PRIMARY EXAMINER